

In the Claims

Applicant has submitted a new complete claim set showing amended claims with insertions indicated by underlining and deletions indicated by strikeouts and/or double bracketing.

Please amend pending claims 1, 3, 5, 8-11, 13, 14, 16, 17, 20, 21, 23, 28, 31, 33, 34, 36 and 40-43 as noted below.

1. (~~Currently amended~~) A method for controlling the rates of concurrent digital transmissions using at least first and second queues having a plurality of locations, said method comprising the steps of:

for each transmission of high priority, writing an index corresponding to a data cell of the high-priority transmission at one of the locations in the first queue;

writing in the same way into the second queue indexes corresponding to transmissions of lower priority;

successively surveying the locations of the first queue at a rate corresponding to a cell transmission rate;

if the surveyed location in the first queue contains an index, transmitting the corresponding data cell, freeing the surveyed location, and rewriting the index at the location in the first queue that is distant from the surveyed location in the first queue by a value determined by the rate of the corresponding transmission;

successively surveying the locations of the second queue; and

if the surveyed location in the second queue contains an index, transmitting the corresponding data cell when the surveyed location in the first queue does not contain an index, freeing the surveyed location in the second queue and rewriting the index at the location in the second queue that is distant from said surveyed location in the second queue by a value determined by the rate of the corresponding transmission.

2. (Original) The method of claim 1, further comprising the steps of:

interrupting the surveying of the first queue when the number of indexes in the first queue reaches a predetermined limit; and

resuming the surveying of the first queue when a rate pointer is incremented.

3. (Currently amended) ~~The method of claim 2, further comprising the steps of:~~ A method for controlling the rates of concurrent digital transmissions using at least first and second queues having a plurality of locations, said method comprising the steps of:
- for each transmission of high priority, writing an index corresponding to a data cell of the high-priority transmission at one of the locations in the first queue;
 - writing in the same way into the second queue indexes corresponding to transmissions of lower priority;
 - successively surveying the locations of the first queue at a rate corresponding to a cell transmission rate;
 - if the surveyed location in the first queue contains an index, transmitting the corresponding data cell, freeing the surveyed location, and rewriting the index at the location in the first queue that is distant from the surveyed location in the first queue by a value determined by the rate of the corresponding transmission;
 - successively surveying the locations of the second queue;
 - if the surveyed location in the second queue contains an index, transmitting the corresponding data cell when the surveyed location in the first queue does not contain an index, freeing the surveyed location in the second queue and rewriting the index at the location in the second queue that is distant from said surveyed location in the second queue by a value determined by the rate of the corresponding transmission;
 - interrupting the surveying of the first queue when the number of indexes in the first queue reaches a predetermined limit;
 - resuming the surveying of the first queue when a rate pointer is incremented;
 - writing a ghost index into at least one of the locations in the first queue; and
 - if the surveyed location in the first queue contains a ghost index, freeing the surveyed location and rewriting the ghost index at one of the locations in the first queue.

4. (Original) The method of claim 2, further comprising the steps of:
counting the number of transmissions of each type corresponding to the indexes written in the first and second queues; and
if the number of transmissions of a given type reaches a predetermined limit, forbidding creation of a new transmission of that type.
5. (Currently amended) ~~The method of claim 1, further comprising the steps of:~~ A method for controlling the rates of concurrent digital transmissions using at least first and second queues having a plurality of locations, said method comprising the steps of:
for each transmission of high priority, writing an index corresponding to a data cell of the high-priority transmission at one of the locations in the first queue;
writing in the same way into the second queue indexes corresponding to transmissions of lower priority;
successively surveying the locations of the first queue at a rate corresponding to a cell transmission rate;
if the surveyed location in the first queue contains an index, transmitting the corresponding data cell, freeing the surveyed location, and rewriting the index at the location in the first queue that is distant from the surveyed location in the first queue by a value determined by the rate of the corresponding transmission;
successively surveying the locations of the second queue;
if the surveyed location in the second queue contains an index, transmitting the corresponding data cell when the surveyed location in the first queue does not contain an index, freeing the surveyed location in the second queue and rewriting the index at the location in the second queue that is distant from said surveyed location in the second queue by a value determined by the rate of the corresponding transmission;
writing a ghost index into at least one of the locations in the first queue; and
if the surveyed location in the first queue contains a ghost index, freeing the surveyed location and rewriting the ghost index at one of the locations in the first queue.

6. (Original) The method of claim 5, wherein the ghost index is rewritten at a random distance from the surveyed location.

7. (Original) The method of claim 1, further comprising the steps of:
counting the number of transmissions of each type corresponding to the indexes written in the first queue; and
if the number of transmissions of a given type reaches a predetermined limit, forbidding creation of a new transmission of that type.

8. (Currently amended) A method for controlling the rates of concurrent digital transmissions using at least first and second queues having a plurality of locations, said method comprising the steps of:
for each transmission, writing an index corresponding to a data cell of the transmission at one of the locations in the first queue and/or the second queue;
successively surveying the locations of the first queue at a higher rate than a cell transmission rate;
successively surveying the locations of the second queue;
if the surveyed location in the first queue contains an index, transmitting the corresponding data cell, freeing the surveyed location, and rewriting the index at the location in the first queue that is distant from the surveyed location by a predetermined value;
interrupting the surveying of the first queue when the location indicated by a rate pointer is reached; and
incrementing the rate pointer by N locations at the transmission rate of N cells.

9. (Currently amended) ~~The method of claim 8, further comprising the step of~~ A method for controlling the rates of concurrent digital transmissions using at least first and second queues having a plurality of locations, said method comprising the steps of:
for each transmission, writing an index corresponding to a data cell of the transmission at one of the locations in the first queue and/or the second queue;

successively surveying the locations of the first queue at a higher rate than a cell transmission rate;

successively surveying the locations of the second queue;

if the surveyed location in the first queue contains an index, transmitting the corresponding data cell, freeing the surveyed location, and rewriting the index at the location in the first queue that is distant from the surveyed location by a predetermined value;

interrupting the surveying of the first queue when the location indicated by a rate pointer is reached;

incrementing the rate pointer by N locations at the transmission rate of N cells; and

if the surveyed location in the second queue contains an index, transmitting the corresponding data cell when the surveyed location in the first queue does not contain an index or when the surveying of the first queue is interrupted.

10. (Currently amended) The method of claim [[9]] 8, further comprising the step of writing into the first queue indexes corresponding to high priority transmissions and writing into ~~a~~the second queue indexes corresponding to lower priority transmissions.

11. (Currently amended) A machine-readable medium encoded with a program for controlling the rates of concurrent digital transmissions using at least first and second queues having a plurality of locations, said program containing instructions for performing the steps of:

for each transmission of high priority, writing an index corresponding to a data cell of the high-priority transmission at one of the locations in the first queue;

writing in the same way into the second queue indexes corresponding to transmissions of lower priority;

successively surveying the locations of the first queue at a rate corresponding to a cell transmission rate;

if the surveyed location in the first queue contains an index, transmitting the corresponding data cell, freeing the surveyed location, and rewriting the index at the location in the first queue that is distant from the surveyed location in the first queue by a value determined by the rate of the corresponding transmission;

successively surveying the locations of the second queue; and
if the surveyed location in the second queue contains an index, transmitting the corresponding data cell when the surveyed location in the first queue does not contain an index, freeing the surveyed location in the second queue and rewriting the index at the location in the second queue that is distant from said surveyed location in the second queue by a value determined by the rate of the corresponding transmission.

12. (Original) The machine-readable medium of claim 11, wherein said program further contains instructions for performing the steps of:

interrupting the surveying of the first queue when the number of indexes in the first queue reaches a predetermined limit; and
resuming the surveying of the first queue when a rate pointer is incremented.

13. ~~(Currently amended)~~ ~~The machine-readable medium of claim 12, wherein said program further contains instructions for performing the steps of:~~ A machine-readable medium encoded with a program for controlling the rates of concurrent digital transmissions using at least first and second queues having a plurality of locations, said program containing instructions for performing the steps of:

for each transmission of high priority, writing an index corresponding to a data cell of the high-priority transmission at one of the locations in the first queue;

writing in the same way into the second queue indexes corresponding to transmissions of lower priority;

successively surveying the locations of the first queue at a rate corresponding to a cell transmission rate;

if the surveyed location in the first queue contains an index, transmitting the corresponding data cell, freeing the surveyed location, and rewriting the index at the location in the first queue that is distant from the surveyed location in the first queue by a value determined by the rate of the corresponding transmission;

successively surveying the locations of the second queue;

if the surveyed location in the second queue contains an index, transmitting the corresponding data cell when the surveyed location in the first queue does not contain an index, freeing the surveyed location in the second queue and rewriting the index at the location in the second queue that is distant from said surveyed location in the second queue by a value determined by the rate of the corresponding transmission;

interrupting the surveying of the first queue when the number of indexes in the first queue reaches a predetermined limit;

resuming the surveying of the first queue when a rate pointer is incremented;

writing a ghost index into at least one of the locations in the first queue; and

if the surveyed location in the first queue contains a ghost index, freeing the surveyed location and rewriting the ghost index at one of the locations in the first queue.

14. (Currently amended) ~~The machine-readable medium of claim 11, wherein said program further contains instructions for performing the steps of:~~ A machine-readable medium encoded with a program for controlling the rates of concurrent digital transmissions using at least first and second queues having a plurality of locations, said program containing instructions for performing the steps of:

for each transmission of high priority, writing an index corresponding to a data cell of the high-priority transmission at one of the locations in the first queue;

writing in the same way into the second queue indexes corresponding to transmissions of lower priority;

successively surveying the locations of the first queue at a rate corresponding to a cell transmission rate;

if the surveyed location in the first queue contains an index, transmitting the corresponding data cell, freeing the surveyed location, and rewriting the index at the location in the first queue that is distant from the surveyed location in the first queue by a value determined by the rate of the corresponding transmission;

successively surveying the locations of the second queue;

if the surveyed location in the second queue contains an index, transmitting the corresponding data cell when the surveyed location in the first queue does not contain an index,

freeing the surveyed location in the second queue and rewriting the index at the location in the second queue that is distant from said surveyed location in the second queue by a value determined by the rate of the corresponding transmission;

writing a ghost index into at least one of the locations in the first queue; and
if the surveyed location in the first queue contains a ghost index, freeing the surveyed location and rewriting the ghost index at one of the locations in the first queue.

15. (Original) The machine-readable medium of claim 11, wherein said program further contains instructions for performing the steps of:

counting the number of transmissions of each type corresponding to the indexes written in the first queue; and

if the number of transmissions of a given type reaches a predetermined limit, forbidding creation of a new transmission of that type.

16. (~~Currently~~ amended) A machine-readable medium encoded with a program for controlling the rates of concurrent digital transmissions using at least first and second queues having a plurality of locations, said program containing instructions for performing the steps of:

for each transmission, writing an index corresponding to a data cell of the transmission at one of the locations in the first queue and/or the second queue;

successively surveying the locations of the first queue at a higher rate than a cell transmission rate;

successively surveying the locations of the second queue;

if the surveyed location in the first queue contains an index, transmitting the corresponding data cell, freeing the surveyed location, and rewriting the index at the location in the first queue that is distant from the surveyed location by a predetermined value;

interrupting the surveying of the first queue when the location indicated by a rate pointer is reached; and

incrementing the rate pointer by N locations at the transmission rate of N cells.

17. (Currently amended) ~~The machine-readable medium of claim 16, wherein said program further contains instructions for performing the step of~~ A machine-readable medium encoded with a program for controlling the rates of concurrent digital transmissions using at least first and second queues having a plurality of locations, said program containing instructions for performing the steps of:

for each transmission, writing an index corresponding to a data cell of the transmission at one of the locations in the first queue and/or the second queue;

successively surveying the locations of the first queue at a higher rate than a cell transmission rate;

successively surveying the locations of the second queue;

if the surveyed location in the first queue contains an index, transmitting the corresponding data cell, freeing the surveyed location, and rewriting the index at the location in the first queue that is distant from the surveyed location by a predetermined value;

interrupting the surveying of the first queue when the location indicated by a rate pointer is reached;

incrementing the rate pointer by N locations at the transmission rate of N cells; and

if the surveyed location in the second queue contains an index, transmitting the corresponding data cell when the surveyed location in the first queue does not contain an index or when the surveying of the first queue is interrupted.

18. (Original) The machine-readable medium of claim 16, wherein said program further contains instructions for performing the step of writing into the first queue indexes corresponding to high priority transmissions and writing into a second queue indexes corresponding to lower priority transmissions.

19. (Previously presented) A method for controlling rates of concurrent digital transmissions, comprising:

using at least first and second queues, each having a plurality of locations;

for each transmission of relatively high priority, writing an index corresponding to a data cell of the relatively high priority transmission in one of the locations in the first queue;

for each transmission of relatively low priority, writing an index corresponding to a data cell of the relatively low priority transmission in one of the locations in the second queue;

successively accessing the locations in the first queue at a rate corresponding to a cell transmission rate;

if the accessed location in the first queue contains an index, transmitting the corresponding data cell, freeing the accessed location, and rewriting the index at a location in the first queue that is distant from the accessed location in the first queue by a value determined by the rate of the corresponding transmission;

successively accessing the locations in the second queue; and

if the accessed location in the second queue contains an index, transmitting the corresponding data cell when the accessed location in the first queue does not contain an index, freeing the accessed location in the second queue and rewriting the index at a location in the second queue that is distant from the accessed location in the second queue by a value determined by the rate of the corresponding transmission.

20. (Currently amended) ~~A method as defined in claim 19,~~ A method for controlling rates of concurrent digital transmissions, comprising:

using at least first and second queues, each having a plurality of locations;

for each transmission of relatively high priority, writing an index corresponding to a data cell of the relatively high priority transmission in one of the locations in the first queue;

for each transmission of relatively low priority, writing an index corresponding to a data cell of the relatively low priority transmission in one of the locations in the second queue;

successively accessing the locations in the first queue at a rate corresponding to a cell transmission rate;

if the accessed location in the first queue contains an index, transmitting the corresponding data cell, freeing the accessed location, and rewriting the index at a location in the first queue that is distant from the accessed location in the first queue by a value determined by the rate of the corresponding transmission;

successively accessing the locations in the second queue; and

if the accessed location in the second queue contains an index, transmitting the corresponding data cell when the accessed location in the first queue does not contain an index, freeing the accessed location in the second queue and rewriting the index at a location in the second queue that is distant from the accessed location in the second queue by a value determined by the rate of the corresponding transmission;

wherein the index is rewritten in the first queue at a distance from the accessed location that is inversely proportional to the rate of the corresponding transmission.

21. ~~(Currently amended)~~ A method as defined in claim 19, further comprising: A method for controlling rates of concurrent digital transmissions, comprising:

using at least first and second queues, each having a plurality of locations;

for each transmission of relatively high priority, writing an index corresponding to a data cell of the relatively high priority transmission in one of the locations in the first queue;

for each transmission of relatively low priority, writing an index corresponding to a data cell of the relatively low priority transmission in one of the locations in the second queue;

successively accessing the locations in the first queue at a rate corresponding to a cell transmission rate;

if the accessed location in the first queue contains an index, transmitting the corresponding data cell, freeing the accessed location, and rewriting the index at a location in the first queue that is distant from the accessed location in the first queue by a value determined by the rate of the corresponding transmission;

successively accessing the locations in the second queue;

if the accessed location in the second queue contains an index, transmitting the corresponding data cell when the accessed location in the first queue does not contain an index, freeing the accessed location in the second queue and rewriting the index at a location in the second queue that is distant from the accessed location in the second queue by a value determined by the rate of the corresponding transmission;

associating a first cell pointer with the first queue and a second cell pointer with the second queue;

incrementing each cell pointer when the respective accessed location is not occupied;

incrementing one of the cell pointers when the corresponding data cell is transmitted; and
not incrementing the second cell pointer when the accessed locations in the first and
second queues are both occupied.

22. (Previously presented) A method as defined in claim 21, wherein the first and second
cell pointers are incremented at different rates that correspond to the passbands assigned to the
types of connections associated with the first and second queues.

23. (Currently amended) ~~A method as defined in claim 19, further comprising:~~ A method for
controlling rates of concurrent digital transmissions, comprising:

using at least first and second queues, each having a plurality of locations;
for each transmission of relatively high priority, writing an index corresponding to a data
cell of the relatively high priority transmission in one of the locations in the first queue;
for each transmission of relatively low priority, writing an index corresponding to a data
cell of the relatively low priority transmission in one of the locations in the second queue;
successively accessing the locations in the first queue at a rate corresponding to a cell
transmission rate;
if the accessed location in the first queue contains an index, transmitting the
corresponding data cell, freeing the accessed location, and rewriting the index at a location in the
first queue that is distant from the accessed location in the first queue by a value determined by
the rate of the corresponding transmission;
successively accessing the locations in the second queue;
if the accessed location in the second queue contains an index, transmitting the
corresponding data cell when the accessed location in the first queue does not contain an index,
freeing the accessed location in the second queue and rewriting the index at a location in the
second queue that is distant from the accessed location in the second queue by a value
determined by the rate of the corresponding transmission;
writing a ghost index into at least one of the locations in the first queue; and

if the accessed location in the first queue contains a ghost index, freeing the accessed location and rewriting the ghost index in the first queue at a random distance from the accessed location.

24. (Previously presented) A method as defined in claim 19, further comprising:
interrupting the accessing of the first queue when the number of indexes in the first queue reaches a predetermined limit; and
resuming the accessing of the first queue when a rate pointer is incremented.
25. (Previously presented) A method as defined in claim 24, further comprising
incrementing the rate pointer by N locations at the transmission rate of N cells.
26. (Previously presented) A method as defined in claim 19, further comprising:
interrupting the accessing of the first queue when a location indicated by a rate pointer is reached; and
incrementing the rate pointer by N locations at the transmission rate of N cells.
27. (Previously presented) A method for controlling rates of concurrent digital transmissions, comprising:
using at least first and second queues, each having a plurality of locations;
for each transmission, writing an index corresponding to a data cell of the transmission in one of the locations in the first queue or the second queue;
successively accessing the locations of the first queue at a higher rate than a cell transmission rate;
successively accessing the locations of the second queue;
if the accessed location in the first queue contains an index, transmitting the corresponding data cell, freeing the accessed location, and rewriting the index at a location in the first queue that is distant from the accessed location by a predetermined value;
interrupting the accessing of the first queue when a location indicated by a rate pointer is reached; and

incrementing the rate pointer by N locations at the transmission rate of N cells.

28. (Currently amended) ~~A method as defined in claim 27, further comprising,~~ A method for controlling rates of concurrent digital transmissions, comprising:

using at least first and second queues, each having a plurality of locations;

for each transmission, writing an index corresponding to a data cell of the transmission in one of the locations in the first queue or the second queue;

successively accessing the locations of the first queue at a higher rate than a cell transmission rate;

successively accessing the locations of the second queue;

if the accessed location in the first queue contains an index, transmitting the corresponding data cell, freeing the accessed location, and rewriting the index at a location in the first queue that is distant from the accessed location by a predetermined value;

interrupting the accessing of the first queue when a location indicated by a rate pointer is reached;

incrementing the rate pointer by N locations at the transmission rate of N cells; and

if the accessed location in the second queue contains an index, transmitting the corresponding data cell when the accessed location in the first queue does not contain an index or when the accessing of the first queue is interrupted.

29. (Previously presented) A method as defined in claim 27, further comprising writing into the first queue indexes corresponding to relatively high priority transmissions and writing into the second queue indexes corresponding to relatively low priority transmissions.

30. (Previously presented) A method as defined in claim 27, further comprising:

interrupting the accessing of the first queue when the number of indexes in the first queue reaches a predetermined limit; and

resuming the accessing of the first queue when the rate pointer is incremented.

31. (Currently amended) A method for controlling rates of concurrent digital transmissions, comprising:

using a queue having a plurality of locations;

for each transmission, writing an index corresponding to a data cell of the transmission at one of the locations in the queue;

successively accessing the locations of the queue at a rate corresponding to a cell transmission rate;

if the accessed location in the queue contains an index, transmitting the corresponding data cell, freeing the accessed location, and rewriting the index at a location in the queue that is distant from the accessed location by a value determined by the rate of the corresponding transmission;

writing a ghost index into at least one of the locations in the queue; and

if the accessed location in the queue contains a ghost index, freeing the accessed location and rewriting the ghost index in the queue at a random distance from the accessed location.

32. (Previously Presented) Apparatus for controlling rates of concurrent digital transmissions, comprising:

a memory having defined therein at least first and second queues, each having a plurality of locations; and

a controller including:

means, for each transmission of relatively high priority, for writing an index corresponding to a data cell of the relatively high priority transmission in one of the locations in the first queue;

means, for each transmission of relatively low priority, for writing an index corresponding to a data cell of the relatively low priority transmission in one of the locations in the second queue;

means for successively accessing the locations in the first queue at a rate corresponding to a cell transmission rate;

means, if the accessed location in the first queue contains an index, for transmitting the corresponding data cell, for freeing the accessed location and for

rewriting the index at a location in the first queue that is distant from the accessed location in the first queue by a value determined by the rate of the corresponding transmission;

means for successively accessing the locations in the second queue; and

means, if the accessed location in the second queue contains an index, for transmitting the corresponding data cell when the accessed location in the first queue does not contain an index, for freeing the accessed location in the second queue and for rewriting the index at a location in the second queue that is distant from the accessed location in the second queue by a value determined by the rate of the corresponding transmission.

33. ~~(Currently amended) Apparatus as defined in claim 32~~ Apparatus for controlling rates of concurrent digital transmissions, comprising:

a memory having defined therein at least first and second queues, each having a plurality of locations; and

a controller including:

means, for each transmission of relatively high priority, for writing an index corresponding to a data cell of the relatively high priority transmission in one of the locations in the first queue;

means, for each transmission of relatively low priority, for writing an index corresponding to a data cell of the relatively low priority transmission in one of the locations in the second queue;

means for successively accessing the locations in the first queue at a rate corresponding to a cell transmission rate;

means, if the accessed location in the first queue contains an index, for transmitting the corresponding data cell, for freeing the accessed location and for rewriting the index at a location in the first queue that is distant from the accessed location in the first queue by a value determined by the rate of the corresponding transmission;

means for successively accessing the locations in the second queue; and

means, if the accessed location in the second queue contains an index, for transmitting the corresponding data cell when the accessed location in the first queue does not contain an index, for freeing the accessed location in the second queue and for rewriting the index at a location in the second queue that is distant from the accessed location in the second queue by a value determined by the rate of the corresponding transmission, wherein the index is rewritten in the first queue at a distance from the accessed location that is inversely proportional to the rate of the corresponding transmission.

34. ~~(Currently amended) Apparatus as defined in claim 32, wherein the controller further comprises:~~ Apparatus for controlling rates of concurrent digital transmissions, comprising:

a memory having defined therein at least first and second queues, each having a plurality of locations; and

a controller including:

means, for each transmission of relatively high priority, for writing an index corresponding to a data cell of the relatively high priority transmission in one of the locations in the first queue;

means, for each transmission of relatively low priority, for writing an index corresponding to a data cell of the relatively low priority transmission in one of the locations in the second queue;

means for successively accessing the locations in the first queue at a rate corresponding to a cell transmission rate;

means, if the accessed location in the first queue contains an index, for transmitting the corresponding data cell, for freeing the accessed location and for rewriting the index at a location in the first queue that is distant from the accessed location in the first queue by a value determined by the rate of the corresponding transmission;

means for successively accessing the locations in the second queue;

means, if the accessed location in the second queue contains an index, for transmitting the corresponding data cell when the accessed location in the first queue

does not contain an index, for freeing the accessed location in the second queue and for rewriting the index at a location in the second queue that is distant from the accessed location in the second queue by a value determined by the rate of the corresponding transmission;

means for associating a first cell pointer with the first queue and a second cell pointer with the second queue;

means for incrementing each cell pointer when the respective accessed location is not occupied;

means for incrementing one of the cell pointers when the corresponding data cell is transmitted; and

means for not incrementing the second cell pointer when the accessed locations in the first and second queues are both occupied.

35. (Previously presented) Apparatus as defined in claim 34, wherein the first and second cell pointers are incremented at different rates that correspond to the passbands assigned to the types of connections associated with the first and second queues.

36. (Currently amended) ~~Apparatus as defined claim 32, wherein the controller further comprises:~~ Apparatus for controlling rates of concurrent digital transmissions, comprising:

a memory having defined therein at least first and second queues, each having a plurality of locations; and

a controller including:

means, for each transmission of relatively high priority, for writing an index corresponding to a data cell of the relatively high priority transmission in one of the locations in the first queue;

means, for each transmission of relatively low priority, for writing an index corresponding to a data cell of the relatively low priority transmission in one of the locations in the second queue;

means for successively accessing the locations in the first queue at a rate corresponding to a cell transmission rate;

means, if the accessed location in the first queue contains an index, for transmitting the corresponding data cell, for freeing the accessed location and for rewriting the index at a location in the first queue that is distant from the accessed location in the first queue by a value determined by the rate of the corresponding transmission;

means for successively accessing the locations in the second queue;

means, if the accessed location in the second queue contains an index, for transmitting the corresponding data cell when the accessed location in the first queue does not contain an index, for freeing the accessed location in the second queue and for rewriting the index at a location in the second queue that is distant from the accessed location in the second queue by a value determined by the rate of the corresponding transmission;

means for writing a ghost index into at least one of the locations in the first queue;

and

means, if the accessed location in the first queue contains a ghost index, for freeing the accessed location and for rewriting the ghost index in the first queue at a random distance from the accessed location.

37. (Previously presented) Apparatus as defined in claim 32, wherein the controller further comprises:

means for interrupting the accessing of the first queue when the number of indexes in the first queue reaches a predetermined limit; and

means for resuming the accessing of the first queue when a rate pointer is incremented.

38. (Previously presented) Apparatus as defined in claim 37, wherein the controller further comprises means for incrementing the rate pointer by N locations at the transmission rate of N cells.

39. (Previously presented) Apparatus for controlling rates of concurrent digital transmissions, comprising:

a memory having defined therein at least first and second queues, each having a plurality of locations; and

a controller including:

means, for each transmission, for writing an index corresponding to a data cell of the transmission in one of the locations in the first queue or the second queue;

means for successively accessing the locations of the first queue at a higher rate than a cell transmission rate;

means for successively accessing the locations of the second queue;

means, if the accessed location in the first queue contains an index, for transmitting the corresponding data cell, for freeing the accessed location, and for rewriting the index at a location in the first queue that is distant from the accessed location by a predetermined value;

means for interrupting the accessing of the first queue when a location indicated by a rate pointer is reached; and

means for incrementing the rate pointer by N locations at the transmission rate of N cells.

40. ~~(Currently amended) Apparatus as defined in claim 39, wherein the controller further comprises,~~ Apparatus for controlling rates of concurrent digital transmissions, comprising:

a memory having defined therein at least first and second queues, each having a plurality of locations; and

a controller including:

means, for each transmission, for writing an index corresponding to a data cell of the transmission in one of the locations in the first queue or the second queue;

means for successively accessing the locations of the first queue at a higher rate than a cell transmission rate;

means for successively accessing the locations of the second queue;

means, if the accessed location in the first queue contains an index, for transmitting the corresponding data cell, for freeing the accessed location, and for

rewriting the index at a location in the first queue that is distant from the accessed location by a predetermined value;

means for interrupting the accessing of the first queue when a location indicated by a rate pointer is reached;

means for incrementing the rate pointer by N locations at the transmission rate of N cells; and

means, if the accessed location in the second queue contains an index, for transmitting the corresponding data cell when the accessed location in the first queue does not contain an index or when the accessing of the first queue is interrupted.

41. (Currently amended) Apparatus as defined in claim 39, wherein the controller further comprises means for writing into the first queue ~~indices~~ indexes corresponding to relatively high priority transmissions and for writing into the second queue ~~indices~~ indexes corresponding to relatively low priority transmissions.

42. (Currently amended) ~~Apparatus as defined in claim 39, wherein the controller further comprises:~~ Apparatus for controlling rates of concurrent digital transmissions, comprising:
a memory having defined therein at least first and second queues, each having a plurality of locations; and

a controller including:

means, for each transmission, for writing an index corresponding to a data cell of the transmission in one of the locations in the first queue or the second queue;

means for successively accessing the locations of the first queue at a higher rate than a cell transmission rate;

means for successively accessing the locations of the second queue;

means, if the accessed location in the first queue contains an index, for transmitting the corresponding data cell, for freeing the accessed location, and for rewriting the index at a location in the first queue that is distant from the accessed location by a predetermined value;

means for interrupting the accessing of the first queue when a location indicated by a rate pointer is reached;

means for incrementing the rate pointer by N locations at the transmission rate of N cells;

means for interrupting the accessing of the first queue when the number of indexes in the first queue reaches a predetermined limit; and

means for resuming the accessing of the first queue when the rate pointer is incremented.

43. (Currently ~~amended~~) Apparatus for controlling rates of concurrent digital transmissions, comprising:

a memory having defined therein a queue having a plurality of locations; and
a controller including:

means, for each transmission, for writing an index corresponding to a data cell of the transmission at one of the locations in the queue;

means for successively accessing the locations of the queue at a rate corresponding to a cell transmission rate;

means, if the accessed location in the queue contains an index, for transmitting the corresponding data cell, for freeing the accessed location, and for rewriting the index at a location in the queue that is distant from the accessed location by a value determined by the rate of the corresponding transmission;

means for writing a ghost index into at least one of the locations in the queue; and

means, if the accessed location in the queue contains a ghost index, for freeing the accessed location and for rewriting the ghost index in the queue at a random distance from the accessed location.
